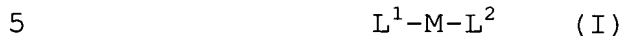


Claims:

1. Transition metal complex of the formula (I)

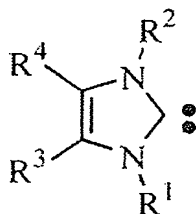


where

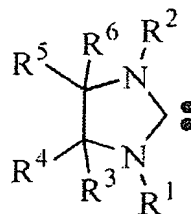
M is a nickel, palladium or platinum atom,

10 L^1 is a ligand having at least one electron-deficient olefinic double bond and

L^2 is a monodentate carbene ligand of the formula (II) or (III)



5 (II)



(III)

15

in which

the R^1 and R^2 radicals are each independently an alkyl radical including a cycloalkyl radical, an aryl radical or heteroaryl radical, each of which may optionally be substituted,

20 and the R^3 to R^6 radicals are each independently selected from a hydrogen or halogen atom, $-NO_2$, $-CN$, $-COOH$, $-CHO$, $-SO_3H$, $-SO_2-(C_1-C_8)alkyl$, $-SO-(C_1-C_8)alkyl$, $-NH-(C_1-C_8)alkyl$, $-N((C_1-C_8)alkyl)_2$, $-NHCO-(C_1-C_4)alkyl$,
 25 $-CF_3$, $-COO-(C_1-C_8)alkyl$, $-CONH_2$, $-CO-(C_1-C_8)alkyl$, $-NHCOH$, $-NH-COO-(C_1-C_4)alkyl$, $-CO-phenyl$, $-COO-phenyl$, $-CH=CH-CO_2-(C_1-C_8)alkyl$, $-CH=CHCO_2H$, $-PO(phenyl)_2$, $-PO((C_1-C_8)alkyl)_2$, an optionally substituted alkyl radical, an optionally substituted aryl radical, or an
 30 optionally substituted heteroaryl radical, or at least

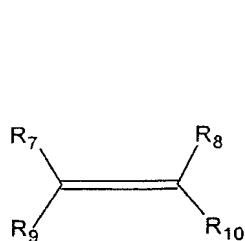
two of the R^3 to R^6 radicals together with the carbon atoms to which they are bonded form a 4- to 12-membered ring.

5 2. Transition metal complex according to Claim 1 where M is Pd.

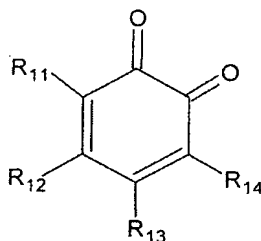
3. Transition metal complex according to Claim 1 or 2 where the electron-deficient olefinic double bond in L^1
10 bears at least one electron-withdrawing substituent selected from a cyano group, an aldehyde group, a ketyl radical, a carboxylic acid group, a carboxylic ester radical, carboxamide radical or N-substituted carboxamide radical.

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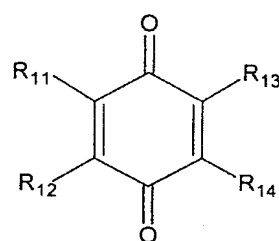
4. Transition metal complex according to one of Claims 1 to 3 where L^1 is selected from compounds of the formulae (IV), (V) or (VI)



(IV)



(V)



(VI)

20

in which

R^7 is selected from $-CN$, $-COH$, $-COR^{15}$, $-COOH$, $-COOR^{15}$, $-CONHR^{15}$, and $-CONR^{15}R^{16}$, where R^{15} and R^{16} are each
25 independently a hydrogen atom, a C_1 - C_6 alkyl radical or C_2 - C_6 alkenyl radical, and

R^8 , R^9 and R^{10} are each independently selected from a hydrogen atom, a C_1 - C_8 alkyl radical, a C_2 - C_8 alkenyl radical, a halogen atom, a hydroxyl group, $-CN$, $-COH$,
30 $-COR^{15}$, $-COOH$, $-COOR^{15}$, $-CONHR^{15}$ and $-CONR^{15}R^{16}$, where R^{15} and R^{16} are each as defined above,

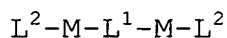
or two suitable R^7 , R^8 , R^9 , R^{10} , R^{15} and R^{16} radicals together with the atoms to which they are bonded form a 5- to 8-membered ring,

R^{11} , R^{12} , R^{13} and R^{14} are each independently selected from a hydrogen atom, a C_1 - C_8 alkyl radical, a halogen atom or -CN, or in each case two of the R^{11} to R^{14} substituents together with the atoms to which they are bonded form a 5- to 8-membered ring.

5. Transition metal complex according to one of Claims 1 to 4 where L^1 is selected from acrylic acid, acrylic esters, acrylonitrile, methacrylic acid, methacrylic esters, methacrylonitrile, benzoquinone, 2-methyl-p-benzoquinone, 2,5-dimethyl-p-benzoquinone, 2,3-dichloro-5,6-dicyano-p-benzoquinone, naphthoquinone, anthraquinone, maleic anhydride, maleimide, maleic acid, maleic esters, fumaric acid, fumaric esters, metal salts of the carboxylic acids mentioned, or tetracyanoethene.

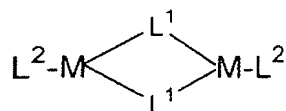
6. Transition metal complex according to one of Claims 1 to 5 where L^2 is selected from 1,3-bis(2,4,6-trimethylphenyl)imidazolinylidene, 1,3-bis(2,6-dimethylphenyl)imidazolinylidene, 1,3-bis(1-adamantyl)imidazolinylidene, 1,3-bis(tert-butyl)imidazolinylidene, 1,3-bis(cyclohexyl)imidazolinylidene, 1,3-bis(o-tolyl)imidazolinylidene, 1,3-bis(2,6-diisopropyl-4-methylphenyl)imidazolinylidene and 1,3-bis(2,6-diisopropylphenyl)imidazolinylidene and 1,3-bis(2,6-diisopropylphenyl)imidazolinylidene, 1,3-bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazolinylidene, 1,3-bis(2,6-dimethylphenyl)-4,5-dihydroimidazolinylidene, 1,3-bis(1-adamantyl)-4,5-dihydroimidazolinylidene, 1,3-bis(tert-butyl)-4,5-dihydroimidazolinylidene, 1,3-bis(cyclohexyl)-4,5-dihydroimidazolinylidene, 1,3-bis(o-tolyl)-4,5-dihydroimidazolinylidene, 1,3-bis(2,6-diisopropyl-4-methylphenyl)-4,5-dihydroimidazolinylidene and 1,3-bis(2,6-diisopropylphenyl)-4,5-dihydroimidazolinylidene.

7. Transition metal complex of the following structure (Ia) or (Ib)



5

(Ia)



10

(Ib)

where L^1 , L^2 and M are each independently as defined in one of Claims 1 to 6, with the proviso that the bridging L^1 radical is selected in such a way that it has a further coordination site for an Ni, Pt or Pd atom.

8. Process for preparing a transition metal complex according to one of Claims 1 to 7, comprising the contacting of the ligand L^2 with a metal complex which contains the fragment L^1-M and an additional ligand which can be displaced readily by the ligand L^2 , where L^1 , M and L^2 are each as defined in Claims 1 to 7.

9. Use of a transition metal complex according to one of Claims 1 to 7 in the homogeneous catalysis of an organic reaction.

10. Use according to Claim 9, wherein the organic reaction is selected from olefinations, arylations, alkylations, ketone arylations, aminations, etherifications, thiolizations, silylations, carbonylations, cyanations or alkynyations of aryl-X compounds or vinyl-X compounds, where X is a leaving group, or of olefinic compounds, or from hydrosilylations of olefins or alkynes or ketones, carbonylations of olefins, di- and oligomerizations of

olefins, telomerization of dienes or cross-couplings with organometallic reagents and other transition metal-catalysed coupling reactions.